

**REMARKS**

**I. Status and Disposition of the Claims**

Claims 1-3 are pending. No claims are amended herein.

The Office continues to reject claims 1-3 under 35 U.S.C § 102(b) as “anticipated by,” or, in the alternative, under 35 U.S.C. § 103(a) as “obvious over” Japanese Publication No. JP 2000-021402 (“Inoue”) for the reasons of record. See Office Action, pages 2-3. Applicants continued to disagree with the Office’s position for at least the reasons of record, as well as the following additional reasons.

**II. Response to the Office’s Position**

**A. Summary of the Office’s position.**

The Office continues to reject claims 1-3 under 35 U.S.C § 102(b) as “anticipated by,” or, in the alternative, under 35 U.S.C. § 103(a) as “obvious over” Japanese Publication No. JP 2000-021402 (“Inoue”) largely for the reasons of record.<sup>1</sup> See Office Action, pages 2-3. In particular, it appears that Office has maintained these rejections for the following four reasons.

First, the Office indicates that “Applicant... has not provided information or support for where the provided data [in the declaration] is found within the Inoue reference.” *Id.* at 4. Second, the Office asserts that “[t]he provided data [in the declaration] is not commensurate in scope with the claims.” *Id.* Third, the Office

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<sup>1</sup> Applicants note that the Office does not appear to maintain the position set forth in the March 27, 2007 Office Action, which alleged that “it would have been within the skill of the ordinary artisan to mix the raw material of the active materials at high temperatures, as disclosed by Inoue” so as to obtain the claimed lithium site occupancy rate. See March 27, 2008 Final Office Action, page 3. Thus, Applicants assume that the Office has withdrawn this argument in the present Office Action.

indicates that each of Inoue's "examples of lithium oxide... (paragraphs 21-23) disclose lithium with a stoichiometry of 1, concluding that the occupancy rate of lithium present would be 100%, which is more than the claimed 98% or greater." *Id.* at 5. And fourth, the Office asserts that it would have been obvious to one of ordinary skill in the art to make an active material, consisting essentially of lithium-metal composite oxide, with a carbon-content of 0.12% by weight or less, because it is known in the art to remove much, if not all, of the carbon present in the composite oxide in order to make the composite oxide as pure and dry as possible." *Id.* at 6.

In response, Applicants respectfully continue to disagree with and traverse each of the applied rejections for the reasons of record, as well as the following additional reasons.

**B. Discussion of the September 26, 2007 rule 1.132 declaration, and the Office's inherency position.**

As mentioned above, the Office indicates that the Rule 1.132 declaration submitted September 26, 2007 has been considered, but is unpersuasive. *See id.* at 4. In particular, the Office indicates that:

Applicant has provided an opinion as to why the Inoue... reference does not teach a lithium composite oxide that inherently possesses a lithium occupancy rate of 98% or more, or a carbon amount of 0.12% or less, but has not provided information or support for where the provided data is found within the Inoue reference. Of the data is taught in the reference the applicant must disclose where it is found.

*Id.* In addition, the Office states that:

[t]he provided data is not commensurate in scope with the claimed invention. In the instant application, the SO<sub>4</sub> ions are present in an amount ranging from 0.4 weight % to 2.5

weight %. Applicant has only provided data for and discussed three embodiments [within this range]... The data should include more of a range, preferably data including the end points of 0.4 weight % and 2.5 weight %, as well as data points within the range to provide a more rounded set of results.

*Id.*

In view of the above cited comments, it appears that the Office may be confused with respect to the data submitted in the September 26, 2007 Declaration. Accordingly, Applicants submit the following comments for clarification.

Like the present Office Action, the Office Action dated March 27, 2007 alleged that Inoue's composite oxides inherently possessed the claimed lithium site occupancy rate and carbon content. See Final Office Action dated March 27, 2007, page 3. Applicants disagreed with (and continue to disagree with) the Office's position in this regard, and submitted the September 26, 2007 declaration so as to rebut any prima facie case of inherency. Thus, the purpose of the supplied declaration was, and is, to demonstrate that Inoue's lithium composite oxides do not possess the claimed lithium site occupancy rate and carbon content, despite any alleged compositional similarity with the claimed invention.

Thus, it is noteworthy that claim 1 recites, *inter alia*, "[a]n active material for a positive electrode... consisting essentially of a lithium-metal composite oxide expressed by the general formula of  $\text{Li}_x(\text{Ni}_{1-y}\text{Co}_y)_{1-z}\text{M}_z\text{O}_2\text{...}$ ." Claim 1. As shown, this composite lithium oxide contains both nickel and cobalt. See *id.*

With this in mind, Inoue discloses a lithium oxide of the general formulae,  $\text{Li}_x\text{M}_{1-y}\text{Ni}_y\text{O}_{2-z}$   $\text{X}_a$  and  $\text{Li}_x\text{Ni}_y\text{Co}_{1-y-z}\text{M}_z\text{O}_2$ . See Inoue, paragraphs [0004], [0006], and [0021].

However, Inoue never provides a specific embodiment or example of making a lithium metal composite oxide that includes both nickel and cobalt. Rather, Inoue only discloses specific embodiments of lithium cobalt oxides that contain varying amounts of sulfate. *See id.* at 0078]-[0085]. In addition, Inoue does not disclose a specific method for manufacturing a composite nickel-lithium oxide in accordance with its disclosure. Thus, a simple side by side comparison of the claimed invention and an example in Inoue is not possible, or would be inconclusive with respect to the present claims.

With the above in mind, Applicants note that in paragraph [0026], Inoue discloses that its composite oxides may be formed using lithium carbonate having a high sulfate radical content as a source of lithium. *See id.* at [0025]-[0026]. Indeed, Inoue indicates that to synthesize a positive electrode active material having a sulfate radical, lithium carbonate, cobalt oxide, or nickel oxide, and other oxides which contain a high sulfate content may be used as reactants. *See id.*

Therefore, because Inoue does not disclose a specific method for manufacturing a composite nickel-lithium oxide, samples A, B, and C in the declaration were formulated by: a) preparing a composite nickel hydroxide in accordance with the present application (*see* specification, example 1, table 1, and page 21, line 15-page 22, line 20); b) preparing a commercial lithium carbonate with a sulfate radical content similar to that of samples C-8 through C-10 of Inoue; and c) mixing the lithium carbonate into the composite nickel hydroxide, sintering the mixture, crushing the obtained sintered body, and screening the obtained powder using the method disclosed at page 23, lines 1-12 of the present specification.

Thus, samples A, B, and C of the declaration were manufactured from lithium carbonate, in accordance with the disclosure of Inoue. See Inoue, paragraph [0079] (describing the formation of a composite oxide from powdered lithium carbonate). This is in contrast to certain lithium composite oxides disclosed in the specification, which were manufactured from lithium hydroxide. See specification, page 23.

Once prepared, the lithium site occupancy rate and carbon content of samples A-C of the declaration was measured for comparison against the claimed invention. As shown in the declaration, samples A-C did not exhibit the claimed lithium site occupancy rate or carbon content. That is, samples A, B, and C, which are compositionally similar to Inoue's oxides, and which are made from similar starting materials as Inoue (e.g., lithium carbonate), did not exhibit the claimed site occupancy rate and carbon content.

While Applicants believe that the above comments and the previously supplied declaration are sufficient to rebut the Office's argument that Inoue's composite oxides inherently possess the claimed lithium site occupancy rate, Applicants have prepared two additional samples, D and E, to provide a more "rounded" set of data, per the Office's request. See Office Action, page 4. The lithium composite oxides of samples D and E were manufactured largely in accordance with the method described above and in the previously submitted declaration, and were formulated so as to contain 0.4 weight % and 2.5 weight % of sulfate ion. The resulting data (including the data from previously submitted samples A-C) is provided below.<sup>2</sup>

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<sup>2</sup> Applicants note that they are willing to submit this additional sample data and description in the form of a supplemental Rule 1.132 Declaration, if necessary.

| Sample | Concentration of SO <sub>4</sub> ions in raw material nickel hydroxide (weight %) | Concentration of SO <sub>4</sub> ions in obtained lithium composite oxides (weight %) |
|--------|---|---|
| A      | 0.5   | 0.6   |
| B      | 0.8   | 0.9   |
| C      | 1.2   | 1.5   |
| D      | 0.3   | 0.4   |
| E      | 2.0   | 2.5   |

| Sample | Li occupancy rate of obtained lithium-nickel composite oxide (%) | Carbon content of obtained lithium-nickel composite oxide (weight %) |
|--------|--|--|
| A      | 95.1   | 0.20   |
| B      | 94.5   | 0.22   |
| C      | 93.1   | 0.32   |
| D      | 95.3   | 0.20   |
| E      | 93.0   | 0.37   |

As shown, this data shows that Inoue's lithium composite oxides, which are manufactured from lithium carbonate, do not exhibit the claimed lithium site occupancy rate or the claimed carbon content.

The Office must provide a basis "in fact and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic necessarily flows from the teachings of the applied prior art." *Ex parte Levy*, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Inter. 1990) (emphasis in original). Applicants respectfully continue to

maintain that the Office has not ever established a viable theory of inherency for the reasons of record. However, even if, *arguendo*, the Office has met the necessary burdens to establish a *prima facie* case of inherency, any such *prima facie* case can be rebutted by objective evidence. See M.P.E.P. § 2112(IV).

Here, Applicants submit that the above data and the data presented in the September 26, 2007 declaration is clearly sufficient to rebut the Office's position of inherency. Indeed, this data clearly shows that lithium composite oxides manufactured in accordance with Inoue's disclosure, and which are compositionally similar to Inoue's oxides, do not exhibit the claimed lithium site occupancy ratio and carbon content.

Finally, at least a portion of the Office's inherency argument appears to be based on Inoue's disclosure of lithium composite oxide compositions having lithium "with a stoichiometry of 1." Office Action, page 5. Applicants respectfully submit that this position is erroneous, however, at least because it inappropriately equates the stoichiometric subscripts of Inoue's formulae with lithium site occupancy rate.

It is generally known that the subscripts of a chemical formula convey how much of a particular element is present in a composition, relative to other elements in the composition. For example, the formula " $\text{H}_2\text{O}$ " indicates that for every atom of oxygen in a water molecule, there are two atoms of hydrogen. The subscripts of the chemical formulae for crystalline materials, such as lithium composite oxide of Inoue convey this same information. That is, they convey how much of a particular element is in the composite oxide.

In contrast, the present specification explains that lithium site occupancy rate refers to the relative amount of lithium (3a) sites in the crystalline lattice of a lithium-metal composite oxide that are occupied by lithium, as opposed to some other element. See as-filed specification, page 18, line 9 to page 19, line 16. Ideally, it is desired that such sites are 1-100% occupied by lithium. See *id.* In reality, however, these sites are often occupied by non-lithium ions, such as cobalt, nickel, and aluminum, thus lowering lithium site occupancy rate below 100%. Indeed, even in cases where lithium is added with a stoichiometry of 1.05 relative to other elements in a composite oxide, it is not necessarily the case that lithium site occupancy rate exceeds 98%, as claimed. Thus, contrary to the Office's assertions, it is clear that the relative amount of an element in a composition has nothing to do with lithium site occupancy rate.

From the above, it is clear that Inoue does not teach or even suggest each and every element of the present claims. In particular, Inoue does not disclose a lithium composite oxide that expressly or inherently contains the claimed lithium site occupancy rate. Accordingly, Applicants respectfully submit that the 35 U.S.C. § 102(b) rejection of claims 1-3 as anticipated by Inoue is improper, and request its withdrawal.

**D. The 35 U.S.C. § 103(a) rejection is improper**

With respect to the § 103(a) rejection of claims 1-3, the Office notes that even in the case of an obviousness rejection, when a *prima facie* case of inherency is established, the burden is on Applicants to show that Inoue does not expressly or inherently possess the claimed characteristics. Office Action, page 5. In addition, the Office asserts that it would have been obvious to one of ordinary skill in the art to modify



Inoue's lithium composite oxides such that they contain 0.12 weight % or less, "because it is known in the art to remove as much, if not all, of the carbon present in the composite oxide in order to make the composite oxide as pure and dry as possible." *Id.*

In response, Applicants have clearly rebutted the Office's assertion that Inoue inherently possesses the claimed lithium site occupancy rate and carbon content above in their prior response. Thus, for the sake of brevity these arguments are not repeated.

As to the Office's position that it would have been obvious to one of ordinary skill to modify Inoue's compositions such that they contain the claimed carbon content, Applicants respectfully disagree for at least the following reasons.

Several basic factual inquiries must be made in order to determine the obviousness or non-obviousness of claims of a patent application under 35 U.S.C.

§ 103. These factual inquiries, set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 17, 148 U.S.P.Q. 459, 467 (1966), require the Examiner to:

- (1) Determine the scope and content of the prior art;
- (2) Ascertain the differences between the prior art and the claims in issue;
- (3) Resolve the level of ordinary skill in the pertinent art; and
- (4) Evaluate evidence of secondary considerations.

The obviousness or non-obviousness of the claimed invention is then evaluated in view of the results of these inquiries. *Graham*, 383 U.S. at 17-18, 148 U.S.P.Q. at 467; see also *KSR Internat'l Co. v. Teleflex Inc.*, 127 S. Ct. 1727 (2007).

In the recent *KSR* case, the Supreme Court recognized that a showing of "teaching, suggestion, or motivation" to modify or combine the teachings of cited references could provide helpful insight in determining whether the claimed subject

matter is obvious under Section 103(a). *Id.* at 1741. In addition, the Supreme Court mandated that "[t]o facilitate review, this analysis [of whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue] should be made explicit." *Id.* (citing *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir., 2006) ("[R]ejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness")).

Following the *KSR* decision, the Office issued a memorandum to its technology center directors on May 3, 2007, indicating that **"in formulating a rejection under 35 U.S.C. § 103(a) based upon a combination of prior art elements, it remains necessary to identify the reason why a person of ordinary skill in the art would have combined the prior art elements in the manner claimed."** (Emphasis in original).

Accordingly it is clear that to establish a *prima facie* case of obviousness, an examiner must, among other things, identify a reason why a person of ordinary skill in the art would modify a cited reference in a proposed manner. Furthermore, the Federal Circuit has explained that while examiners may rely upon what is generally known in the art, they **must provide evidentiary proof** of that knowledge. See *In re Zurko*, 59 U.S.P.Q.2d 1693, 1697 (Fed. Cir. 2001) ("With respect to core factual findings in a determination of patentability . . . the Board cannot simply reach conclusions based on its own understanding or expertise . . . Rather, the Board **must point to some concrete evidence** in the record in support of these findings.") (emphasis is added).

In the present case, however, the Office has not pointed to any **evidence**

establishing *why* one of ordinary skill would modify Inoue's compositions in the manner asserted, i.e., to reduce their carbon content to 0.12% or less. Rather, the Office merely asserts, without justification, that the claimed carbon content would have been desirable and obvious to a person of ordinary skill in the art at the time of the invention. Applicants respectfully submit that such bald assertions, without evidence, are insufficient to establish a prima facie case of obviousness.

Moreover, the Office has not provided a tenable rationale explaining *why* one of ordinary skill in the art at the time of the invention would modify Inoue's compositions such that they possess the claimed lithium site occupancy rate. As mentioned above, Inoue's compositions do not inherently possess this characteristic. In addition, Inoue is completely silent with respect to the lithium site occupancy rate of its compositions.

Thus, for at least the reasons of record and the foregoing reasons, Applicants submit that the Office has not established a prima facie case of obviousness with respect to claims 1-3. Accordingly, Applicants respectfully submit that the applied 35 U.S.C. § 103(a) rejection is improper, and should be withdrawn.

**III. Conclusion**

In view of the foregoing remarks, Applicants respectfully submit that the pending claims of the present application are not obvious in view of the references applied by the Examiner. Thus, Applicants respectfully request the Examiner's reconsideration of the application, and the timely allowance of the pending claims.

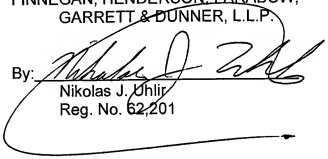
Please grant any extensions of time required to enter this response and charge any additional required fees to our Deposit Account No. 06-0916.

Respectfully submitted,

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